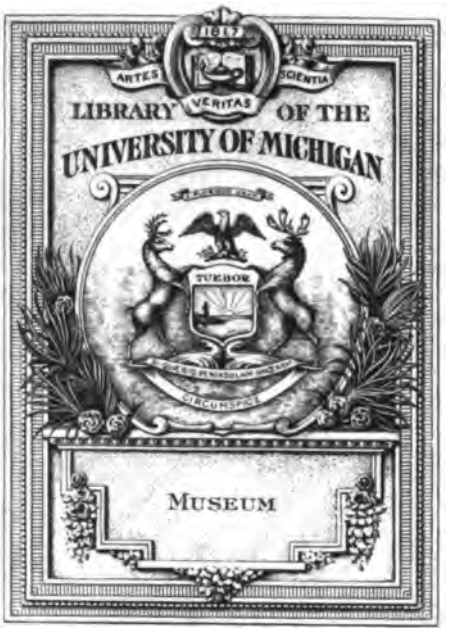

OKADAIRA SHELL MOUND

AT

HITACHI,

BEING

AN APPENDIX

TO

MEMOIR VOL. I. PART I.

OF THE

SCIENCE DEPARTMENT,

TÔKIÔ DAIGAKU.

(UNIVERSITY OF TÔKIÔ.)

BY

I. IIJIMA, AND C. SASAKI,

STUDENTS OF BIOLOGY.

PUBLISHED BY TÔKIÔ DAIGAKU,

TÔKIÔ.

2543 (1883).

OKADAIRA SHELL MOUND

AT

HITACHI,

BEING

AN APPENDIX

TO

PUBLISHED BY TÔKIO DAIGAKU,

TÔKIÔ.

2542 (1882).

OKADAIRA SHELL MOUND

AT

HITACHI,

BEING

AN APPENDIX

TO

MEMOIR VOL. I. PART I.

OF THE

SCIENCE DEPARTMENT,

TÔKIÔ DAIGAKU.

(UNIVERSITY OF TÔKIÔ.)

BY

I. IIJIMA, AND C. SASAKI,

STUDENTS OF BIOLOGY.

PUBLISHED BY TÔKIO DAIGAKU,

TÔKIÔ.

2542 (1882).

PREFACE.

In the summer of 1879, I visited the province of *Hitachi* which is nearly 30 ri distant from Tokio, in order to collect mollusca in the lake of Kasumigaura. Along the coast, there exist numerous fossil remains of marine shells which show evidence that the lake had once been washed by the sea in past times. Bearing in mind this feature, I carefully examined the southern coast of this lake for shell heaps, and was finally rewarded by discovering three shell mounds on the top of a hill known as *Okadaira;* and afterwards found still other mounds at several places not far from the one previously mentioned, viz. one at *Kihara*, two at *Amimura*, one at *Shimadzu;* and on my return to Tokio, I again met with a single enormously large mound at *Kitakatamura* in *Shimôsa*.

In the winter of the same year in company with Mr. Iijima I again visited the same province in order to make still farther researches in regard to these mounds by the order of Mr. Kato President of Tokio Daigaku.

On this occasion, we found a number of other mounds in the same province already mentioned before, but only one was completely examined, and that was the Okadaira mound which was the largest and richest in ancient remains.

The contents of this paper are mainly confined to the contents of this mound, and one of our objects is to compare its features with those of the Omori Shell mounds, which have been well described and accurately figured by Prof. Edw. S. Morse in the first memoir of Tokio Daigaku.

Our thanks are particularly due to the never failing advice of Prof. Edw. S. Morse.

Our thanks are also due to Mr. M. Nishi for the determination of the nature of the stone implements and to Mr. H. Yoshida on chemical analysis, and lastly we are much indebted to our two sincere friends Mr. O. Taneda, and Mr. M. Kikuchi for their kind assistance in many ways.

To the artists Mr. J. Nomura, Mr. M. Indō, and Mr. K. Watanabe, our thanks are specially due for the fidelity with which they have made the illustrations.

I. IIJIMA.
C. SASAKI.

Tokio Japan
1st Sept. 2542 (1882).

OKADAIRA SHELL MOUND AT HITACHI.

BY

I. IIJIMA AND C. SASAKI.

GENERAL CHARACTERS OF THE OKADAIRA SHELL MOUND.

The Okadaira shell mound lies on the south western side of a hill called Okadaira, and the eastern and western sides of it are already cultivated for plantations. A white appearance due to broken shells which the ground possesses in the vicinity of this hill is due to the remains of former mounds which have been scattered and destroyed by the farmers.

The length of this mound is estimated about eighteen ken (about 33 m.) in length, and sixteen ken (about 29 m.) in width, and its surface is thickly covered with a number of huge trees. The soil covering the mound is about six inches in thickness. The height of this mound varies from a foot to seven feet. The thickness of the deposit which varies from six inches to three feet, is in its deepest parts about six feet.

The mound itself is nearly half a ri from the lake of Kasumigaura on the north-eastern side, and also half a ri distant from a branch of the same lake on the west. And furthermore it is distant about five ri (about 12.5 miles) from the shore of the sea of Kashima (Pacific ocean) of Hitachi.

The evidence that the lake was formerly washed by the ocean is shown by ancient historical records of Hitachi (Hitachi Fûdoki) and also from the presence of fossil remains of marine shells at various exposures along the coast.

SPECIAL CHARACTERS OF THE OKADAIRA DEPOSIT.

The Okadaira Mound does not show any remarkable difference in its features from those of the Omori mounds which are described by Prof. Edw. S. Morse in the first memoir of the science department of the University of Tokio in 2539 (1879). As a general rule, objects obtained from such a deposit in both the American and European Continents agree in their general aspect, but each deposit has its special characteristics.

Prof. Morse who is the first discoverer of a mound of this character in the Empire of Japan has pointed out the following characters in regard to the Omori deposit:—"The Omori deposits are also specialized. First: by the presence of enormous quantities of pottery of many different shapes, and of an almost infinite variety of ornamentation. Second: by great scarcity of stone implements, and the absence of arrow heads, spear points and other pointed implements of stone. Not a single arrow head, flake or chip has been found by the various parties who have been there in the interests of the University; and the combined time spent there, if represented by a single individual, would equal over eighty days work of seven hours each." These peculiarities exactly agree with the Okadaira deposit.

The objects thus far found in the Okadaira mound are enumerated as follows:—

POTTERY.

1. Cooking vessels.
2. Hand vessels.
3. Bowls.
4. Pots.
5. Cups.
6. Fragments of pottery possibly used for sinkers.

STONE.

1. Axes.
2. Celts.
3. Worked pumice.
4. Stone with circular pit-like depressions.

HORN.

1. Handle.
2. Prongs of deer's antlers.

BONE.

1. Os calcis of Deer.

POTTERY.

Many earthern vessels, and fragments of potteries were collected in the Okadaira deposit of Hitachi. The vessels are mainly composed of rough materials, and some of their shapes are extraordinarily curious. The pottery is generally thicker than that of the Omori deposit, and mostly ornamented with various designs, plain or unornamented pottery being comparatively rare.

Knobs are generally of large size, and of diversified form. The dimension

of the largest one is 200 mm. in height. (Fig. 1, Pl. IV). This peculiarity in form has never been met with in other deposits, and in most cases, the knobs are large and thick, and perforated with from two to six holes which communicate internally. This remarkable conformation has not been met with in other parts of the empire, and seems to be peculiar to this deposit. In some the knob is simply a slight projection from the rim. In others it forms a twisted loop In other it either projects outward, or internally from the inner surface of the rim. Still further, some rims are conical or notched or undulating.

The designs are various, but we may be able to classify them generally as follows:—as Prof. Morse has described in the Omori Deposit, "The designs are indifinitely varied; generally areas partially or wholly enclosed by curved lines, the area within or without the lines being cord marked, the other area being smooth" (Omori Mounds Memoir p. 8). In others, the entire outer surface is cord marked though in some an area near the margin is left which is destitute of the cord marks. Others have deep pits or grooves incised, and in others still the surface is entirely destitute of the cord impressions, and others have a little area near the margin which is separated from the cord-marked area below. The cord marks which are impressed on the entire surface of potteries extend as far as their margin. In some cases, potteries are entirely destitute of cord marks.

The margins of the potteries are generally smooth and even, but in some cases they are deeply incised forming a sort of knobbed or undulating appearance.

The common ornamentation is either in curved, spiral, or parallel impressions or lines. In many cases, lines cross each other regularly giving a reticulated appearance to the surface. The parallel lines are unevenly interrupted, or a number of parallel lines are interrupted by a zigzag line, or sometimes a number of zigzag lines are arranged one after the other in regular series.

The entire absence of legs or knobs for the support of the vessel shows in this respect a resemblance to the pottery of the Omori Deposits.

The inner surface of rims is, in some cases, marked with two or more parallel grooves. (Fig. 12, Pl. IX., Fig. 3, 9, Pl. VIII).

One hundred and eighty seven bases more or less broken were collected, of which four are marked with the matting impression, and six with irregular scratched lines, and the rest are smooth. The largest bottom thus far examined is about fourteen centimetres in diameter.

In a few vessels the base is slightly larger in diameter than the wall of the vessel arising from it.

Of thousands of specimens more or less broken, seventeen are sufficiently complete to recognize their entire shape. Some are bowl shaped, or cup-like or pot-like. Ten of the pots are bowl shaped of which one is marked with an exquisite ornamentation on the whole area of the body wall, leaving a smooth space near the bottom. The rim is provided with a single knob perforated near the centre. In this specimen evidences of repair are seen in two small holes which have been bored on the margins of a fracture. (Fig. 1, Pl. I).

One of the bowls has a narrow bottom, the mouth is triangular in form. and three knobs marked with a circular impression stand respectively on each of its angles. The body wall is smooth, except the upper part of it where two cord marked bands run side by side. (Fig. 7, 8, Pl. I).

Two cup-shaped pots have thick walls, and both have smooth bases, and uneven rims. The one (Fig. 5, Pl. I) is ornamented with incised lines forming rude oval figures. The other (Fig. 1, Pl. II) is plain, and is somewhat cylindrical in form.

Two pots which have a smooth bottom bulge at the upper part of the body wall, and have flaring rims. (Fig. 6, Pl. I., Fig. 6, Pl. II).

The most curious vessel which is nearly complete, measures 300 mm. in height. The lower half of this vessel is cylindrical in form, while the upper half abruptly enlarges in size. The rim is provided with two knobs, and is marked with two grooves on the upper face. The unstable form of this pot leads us to believe that it might have been used for cooking, the narrower and lower portion being buried in the dirt or ashes, and the fire built about it. (Fig. 3, 4, Pl. I).

Of two pots, one (Fig. 2, Pl. II) is nearly round, its bottom is ill-defined, and its body walls are evenly ornamented with cord impressions. The other (Fig. 3, Pl. II) is similar in form and size, but has, besides a mouth, a single small hole, and that part which separates the mouth from this hole is slightly arched so as to form a sort of handle. Its body wall is rough and destitute of any impression. The material of this pot is reddish clay.

The largest vessel which we have already described (Fig. 9, Pl. II) has the lower half of the body wall ornamented with incised lines and its upper half entirely smooth; and on the boundary line between these two different regions, four small knobs occur leaving a similar space between them.

Bases:—Those with matting impressions are comparatively few, and their figures are more or less different in different vessels. (Fig. 5, 7, Pl. II). The majority of bases are smooth.

A single lump of reddish material was found associated with fragments of pots. This material which is determined as Ferric oxide ($Fe_2 O_3$) by our friend Mr. H. Yoshida, seems to have been used as a mixture with the clay of which the red colored pots were made.

A few pieces of pottery rectangular in shape have been rudely formed probably for the purposes of a sinker, the longer axis have each a single notch. (Fig. 3, 4, 5, Pl. X).

A single specimen of the same kind, has a roundish form and a circular hole near the centre. It is most probable that this fragment has also been used as sinkers of fishing nets.

The chief points which may be recognized under a careful examination of thousands of pots and fragments are briefly as follows:—

1st. The potteries are generally thicker than those obtained from other districts of Japan, and their designs are mostly very ingenious.

2nd. The knobs are abundant in number, their forms exceedingly various, their sizes unusually large. The leading designs of the knobs are the opening of several holes in various styles, as shown in the figures.

3rd. Bottoms are rather numerous. Most of them are smooth though a few are ornamented with matting impressions.

4th. Some vessels are enormous in size, in one case measuring 320 mm. in diameter.

5th. All the pottery is rough and never painted with any sort of pigment.

STONE IMPLEMENTS.

The stone implements collected in the deposite were very few in number, and many were more or less broken, and showed evidences of wear in various ways. Those which are nearly perfect are four adzes and three others. The four entire adzes (Fig. 9, 12, 13, 14, Pl. X) have their edges worn showing that they had been much used. Another implement (Fig. 10, Pl. X) worked out of chlorite schist has both ends broken off, and shows an oval form in section. A specimen (Fig. 11, Pl. X) which is made of a sandstone is somewhat pointed at one end and round at the other. At the rounded end, two little notches are evidently chipped out for the purpose of fastening the stone tightly to a handle by means of a string.

Besides these implements, we have found two worked stones:—the one which is made of pumice nearly oblong in shape, well smoothed at their edges, is morderately flattened, and at a portion near the centre a single round hole occurs which was probably used to pass a string through in order to suspend it. (Fig. 15, Pl. X).

A single drilled stone which is exactly similar in character with that found in the Omori deposit was also found, and thirteen holes are counted on its surface. (Fig. 7, Pl. X).

No hammers, rollers, or mortars were met with such as Prof. Morse discovered lately in the Omori deposits.

It will be observed that as in the Omori and other mounds near Tokio the implements of stone are very rude and few in number.

WORKED HORN AND BONE.

The antlers of deer are abundantly found in the deposits. Most of them (Fig. 2, 3, 4) are roughly cut off, so that their points might be more conveniently used for implements. Another worked antler of deer (Fig. 1, Pl. XI) is well smoothed, the one end is somewhat pointed, and has, at its side three parallel incisions and a single projection below evidently worked out; and the other is much broader, and slightly curved. From this shape, we are inclined to suppose that it might have been used as a hook.

The os calces of deer were also found. They are, in most cases smoothed on their lateral face or at one or both ends. (Fig. 8, Pl. XI).

Three pieces of bone of some mammal not identified are well sharpened to a point. Besides these worked specimens, those found together with potteries are two bones of ox (one is a left humerus, and the other the coössified radius and ulna of the same leg), os calcis of deer, bird's bones, teeth and jaws of deer, a single human bone (left femur), cuttle-fish bones, and hundreds of pieces of the bones of various animals. The human femur is roughly broken off at either end, a comparison with the recent human femur shows no difference in proportions.

Among the deer's antlers, only three pieces have been charred. Among the great quantity of bones found only one bone belonging to man was met with. It is interesting to observe that this bone is rudely broken at both ends, and though it would be unsafe to draw any conclusion from a single example, yet its being broken in precisely the same way as the bones of other mammals might be taken as an indication of cannibalism. And this conclusion would be in accordance with the observations made by Prof. Wyman in the Florida and New England Shell Heaps and of those of Prof. Morse in the Omori and other deposits.

The presence of ox bones in the deposit, are evidently cases of intrusion unless we suppose the wild ox has existed in Japan.

ANCIENT MOLLUSCAN FAUNA OF OKADAIRA DEPOSIT.

Special efforts were made to collect sufficient material, so that a comparison might be made between the recent and ancient mollusks of this region. We failed to accomplish this object owing to the scarcity of the recent shells on the adjacent coast.

The following list enumerates the species of mollusks thus met with in the Okadaira deposit, and as special efforts were made to collect every species in the mound, the list will not probably be much increased by future additions.

The Lamellibranchiates thus far found in the deposit are:—

Arca inflata, Reeve.
Arca subcrenata, Lischke.
Arca granosa, Linné.
Lutraria Nuttali, Conrad.
Mactra veneriformis, Deshayes.
Dosinia Troscheli, Lischke.
Cytherea meretrix, Linné.
Ostrea denslamellosa, Lischke.
Ostrea sp.
Tapes sp.
Tapes sp.

Tellina sp.
Solen sp.
Anomia sp.

The Gasteropoda thus far present in the deposit are:—

Eburna Japonica, Lischke.
Lampania multiformis, Lischke.
Potamides fluviatilis, P. et M.
Rapana bezoar, Linne
Turbo granulatus, Gmelin.
Natica Lamarckiana, Duclos.
Cyclina chinensis, Chem.
Purpura sp.
Cyclostoma sp.
Mya arenaria, Linne.

It is interesting to observe the great scarcity of Mya arenaria, a species extremely abundant in the Hokkaidō (Yeso) deposits as well as in the shell mounds of Omori and Tokio.

Only fourteen specimens of Arca granosa were found and these were much smaller in size than those existing in the southern portions of the empire. Among the twelve perfect specimens, the largest measures 33 mm. in height, 44 mm. in length, while the smallest measures respectively 17 mm. to 23 mm. The number of ribs were nineteen which is the average of the number of ribs seen in the Omori mound specimens. It is probable that this was its northern limit at that time.

The most abundant species found in the deposits are Arca inflata, Reeve, Arca subcrenata, Lischke, Mactra veneriformis, Deshayes, and Rapana bezoar, Linné, and the remaining species were few in number of individuals, and more or less broken.

No worked shells were met with. It is worthy of notice however that the specimens of Rapana bezoar, Linné, have almost always an irregular opening in their body whorl, as if it had been made for the more convenient extraction of the animal.

EXPLANATION OF PLATES.

PLATE I.

Fig. 1. 7 mm. thick, diameter across the mouth 205 mm., height 11 mm bottom smooth. Color blended with black and red. ½ natural size.

Fig. 2. Thickness varies from 11 mm. to 5 mm., diameter across the mou 160 mm., height 75 mm., bottom smooth. Color reddish with so black patches. ½ natural size.

Fig. 3. 15 mm. thick, diameter across the mouth 250 mm., height 300 mm bottom (90 mm. in diam.) smooth, blackish above and below, midw reddish. ⅔ natural size.

Fig. 4. Top view of ditto. Margin 11 mm. thick. ⅔ natural size.

Fig. 5. 9 mm. thick, diameter across the mouth 80 mm., height 47 mm bottom rough, reddish on one side, blackish on the other. ⅔ natural si

Fig. 6. Thickness varies from 10 mm. to 16 mm., diameter across the mou 180 mm., height 195 mm., bottom (65 mm. in diam.) reddish a rough; blackish in color, a few interwoven string marks above, a numerous longitudinal impressions below. ⅔ natural size.

Fig. 7. 6 mm. thick, mouth somewhat triangular in shape, height 135 m bottom (52 mm. in diam.) rough, blackish in color. Reddish abo blackish below. The upper part is decorated with two bands which composed of oblique cord marks. ½ natural size.

Fig. 8. Top view of ditto. Margin marked with fine serrations, and a sin triangular knob rests obliquely on each angle of the mouth. ½ natu size.

PLATE II.

Fig. 1. Thickness varies from 6 mm. to 8 mm., diameter across the mouth 45 mm., height 49 mm., bottom (48 mm. in diam.) rough and marked with a few deep scratches. Reddish grey. $\frac{2}{3}$ natural size.

Fig. 2. Thickness varies from 6 mm. to 8 mm., height 70 mm., bottom rounded, ornamented with cord impressions except near the margin which is smooth. $\frac{2}{3}$ natural size.

Fig. 3. Thickness varies from 4 mm. to 10 mm., height 70 mm., bottom (60 mm. in diam.) rough. Reddish in color. $\frac{2}{3}$ natural size.

Fig. 4. 9 mm. thick, height 80 mm., bottom smooth. Greyish. $\frac{2}{3}$ natural size.

Fig. 5. 7 mm. thick, bottom (70 mm. in diam.) with mat impressions. Reddish black. $\frac{1}{2}$ natural size.

Fig. 6. 6 to 8 mm. thick, smooth, bottom (70 mm. in diam.) with a few roughly scratched marks. $\frac{1}{2}$ natural size.

Fig. 7. 11 mm. thick, smooth, bottom (95 mm. in diam.) with mat impressions. $\frac{1}{2}$ natural size.

Fig. 8. 8 mm. thick, with cord marks above, and smooth below, bottom (80 mm. in diam.) smooth. $\frac{2}{5}$ natural size.

Fig. 9. 10 to 15 mm. thick, margin smooth, mouth 320 mm. in diameter. The upper portion smooth while the remaining portions are ornamented with lines. $\frac{1}{3}$ natural size.

Fig. 10. 10 to 13 mm. thick, margin smooth 7 mm. thick, height 90 mm., bottom (80 mm. in diam.) smooth. Color reddish black. $\frac{1}{2}$ natural size.

Fig. 11. 10 mm. thick, reddish. $\frac{1}{2}$ natural size.

PLATE III.

Fig. 1. 9 mm. thick, reddish above blackish below. $\frac{2}{3}$ natural size.
Fig. 2. Height 140 mm., breadth 95 mm. Brownish grey in color. $\frac{1}{2}$ natural size.
Fig. 3. Side view of ditto. $\frac{1}{2}$ natural size.
Fig. 4. Inside view of ditto. $\frac{1}{2}$ natural size.
Fig. 5. Height 105 mm. Reddish in color. $\frac{1}{2}$ natural size.
Fig. 6. Inside view of ditto. $\frac{1}{2}$ natural size.
Fig. 7. Reddish grey. $\frac{1}{2}$ natural size.
Fig. 8. Inside view of ditto. $\frac{1}{2}$ natural size.
Fig. 9. Reddish grey. $\frac{1}{2}$ natural size.
a. inside view.
b. side view.
Fig. 10. Having seventeen circular pits, (eight in front, three on either side, two behind.) $\frac{1}{2}$ natural size.
Fig. 11. Front view. Reddish black in color. $\frac{1}{2}$ natural size.
Fig. 12. Inside view of ditto. $\frac{1}{2}$ natural size.

PLATE IV.

Fig. 1. Brownish red. $\frac{1}{3}$ natural size.
Fig. 2. Reddish. $\frac{1}{2}$ natural size.
Fig. 3. Reddish. $\frac{1}{2}$ natural size.
Fig. 4. Blackish. $\frac{1}{4}$ natural size.
Fig. 5. Reddish. $\frac{1}{2}$ natural size.
a. front view.
b. side view.
Fig. 6. Body wall 11 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 7. Body wall 10 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 8. Body wall 13 mm. thick, reddish. $\frac{1}{2}$ natural size.

PLATE V.

Fig. 1. Body wall 10 mm. thick, blackish. ½ natural size.
Fig. 2. Body wall 10 mm. thick, blackish above reddish below. ½ natural size
Fig. 3. Body wall 7 mm. thick, blackish. ½ natural size.
Fig. 4. Body wall 11 mm. thick, blackish. ½ natural size.
Fig. 5. Body wall 12 mm. thick, reddish. ½ natural size.
Fig. 6. Body wall 9 mm. thick, reddish brown. ½ natural size.
Fig. 7. Body wall 14 mm. thick, blackish. ½ natural size.
Fig. 8. Body wall 10 mm. thick, reddish yellow. ⅔ natural size.
Fig. 9. Body wall 8 mm. thick, reddish yellow. ⅔ natural size.
Fig. 10. Body wall 7 mm. thick, reddish. ½ natural size.
Fig. 11. Body wall 9 mm. thick, reddish. ½ natural size.

PLATE VI.

Fig. 1. Body wall 12 mm. thick, reddish with some black patches. $\frac{1}{3}$ natural size.
Fig. 2. Body wall 14 mm. thick, reddish above blackish below. $\frac{2}{3}$ natural size.
Fig. 3. Body wall 10 mm. thick, reddish. $\frac{1}{3}$ natural size.
Fig. 4. Body wall 9 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 5. Body wall 9 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 6. Body wall 8 mm. thick, blackish. $\frac{2}{3}$ natural size.
Fig. 7. Body wall 7 mm. thick, brownish red. $\frac{1}{2}$ natural size.
Fig. 8. Body wall 11 mm. thick, blackish. $\frac{1}{3}$ natural size.
Fig. 9. Body wall 10 mm. thick, reddish. $\frac{2}{3}$ natural size.
Fig. 10. Body wall 9 mm. thick, reddish above blackish below. $\frac{2}{3}$ natural size.
Fig. 11. Body wall 9 mm. thick, reddish. natural size.
Fig. 12. Body wall 10 mm. thick, reddish black. $\frac{2}{3}$ natural size.
Fig. 13. Body wall 13 mm. thick, reddish black. $\frac{1}{3}$ natural size.

PLATE VII.

Fig. 1. Body wall 11 mm. thick, blackish. $\frac{2}{3}$ natural size.
Fig. 2. Body wall 9 mm. thick, reddish black. $\frac{1}{2}$ natural size.
Fig. 3. Body wall 9 mm. thick, reddish. $\frac{1}{2}$ natural size.
Fig. 4. Body wall 9 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 5. Body wall 11 mm. thick, yellowish grey. $\frac{1}{2}$ natural size.
Fig. 6. Body wall 12 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 7. Body wall 7 mm. thick, reddish. Margin wavy. $\frac{1}{2}$ natural size.
Fig. 8. Body wall 12 mm. thick, reddish. Ornamented with a series of dots. $\frac{1}{2}$ natural size.
Fig. 9. Body wall 10 mm. thick, reddish. $\frac{1}{2}$ natural size.
Fig. 10. Body 9 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 11. Body wall 11 mm. thick, reddish. $\frac{1}{2}$ natural size.
Fig. 12. Body wall 11 mm. thick, reddish black. $\frac{1}{2}$ natural size.
Fig. 13. Body wall 11 mm. thick, reddish yellow. $\frac{1}{2}$ natural size.
Fig. 14. Body wall 11 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 15. Body wall 11 mm. thick, blackish. $\frac{1}{3}$ natural size.
Fig. 16. Body wall 13 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 17. Body wall 8 mm. thick, brownish red. $\frac{1}{2}$ natural size.

PLATE VIII.

Fig. 1. Body wall 11 mm. thick, blackish above reddish below. ½ natural size.
Fig. 2. Body wall 12 mm. thick, reddish above blackish below. ½ natural size.
Fig. 3. Body wall 9 mm. thick, blackish. ½ natural size.
Fig. 4. Body wall 9 mm. thick, brownish red. ½ natural size.
Fig. 5. Body wall 13 mm. thick, blackish above reddish below. ½ natural size.
Fig. 6. Body wall 15 mm. thick, reddish. ½ natural size.
Fig. 7. Body wall 13 mm. thick, brownish red. ½ natural size.
Fig. 8. Body wall 15 mm. thick, reddish. ½ natural size.
Fig. 9. Body wall 12 mm. thick, yellowish red. ½ natural size.
Fig. 10. Body wall 9 mm. thick, reddish black. ½ natural size.
Fig. 11. Body wall 10 mm. thick, reddish above, blackish below. ½ natural size.

PLATE IX.

Fig. 1. Body wall 9 mm. thick, brownish red. $\frac{2}{5}$ natural size.
Fig. 2. Body wall 13 mm. thick, light yellow. $\frac{1}{2}$ natural size.
Fig. 3. Body wall 7 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 4. Body wall 9 mm. thick, blackish above greyish below. $\frac{1}{3}$ natural size.
Fig. 5. Body wall 7 mm. thick, yellowish grey. $\frac{1}{2}$ natural size.
Fig. 6. Body wall 11 mm. thick, yellowish grey above reddish below. $\frac{1}{2}$ natural size.
Fig. 7. Body wall 6 mm. thick, browish red. $\frac{1}{2}$ natural size.
Fig. 8. Body wall 9 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 9. Body wall 10 mm. thick, reddish. $\frac{1}{2}$ natural size.
Fig. 10. Body wall 13 mm. thick, blackish above reddish below. $\frac{1}{3}$ natural size.
Fig. 11. Body wall 10 mm. thick, reddish above blackish below. $\frac{1}{2}$ natural size.
Fig. 12. Inside surface of ditto showing eight parallel grooves, blackish. $\frac{1}{2}$ natural size.
Fig. 13. Body wall 9 mm. thick, brownish red. $\frac{1}{2}$ natural size.
Fig. 14. Body wall 11 mm. thick, reddish. $\frac{2}{5}$ natural size.
Fig. 15. Body wall 11 mm. thick, greyish. $\frac{1}{2}$ natural size.
Fig. 16. Body wall 9 mm. thick, reddish. $\frac{1}{2}$ natural size.
Fig. 17. Body wall 8 mm. thick, blackish. $\frac{1}{2}$ natural size.
Fig. 18. Body wall 7 mm. thick, blackish above, reddish below. $\frac{1}{2}$ natural size.
Fig. 19. Body wall 11 mm. thick, blackish. $\frac{1}{3}$ natural size.

PLATE X.

Fig. 1. Body wall 7 mm. thick, reddish grey. $\frac{2}{3}$ natural size.
Fig. 2. Body wall 11 mm. thick, blackish above reddish below. $\frac{2}{3}$ natural size.
Fig. 3. Broken piece of pottery notched on opposite sides. $\frac{1}{2}$ natural size.
Fig. 4. ditto. $\frac{1}{2}$ natural size.
Fig. 5. ditto. $\frac{1}{2}$ natural size.
Fig. 6. Broken piece of pottery with a round hole near the centre. $\frac{1}{2}$ natural size.
Fig. 7. Drilled stone. $\frac{1}{2}$ natural size.
Fig. 8. Worked stone with three holes communicating internally. $\frac{2}{3}$ natural size.
a. top. view.
Fig. 9. Rude adze made of Tufacious stone. $\frac{2}{3}$ natural size.
Fig. 10. Worked stone broken on either end. Chlorite schist. $\frac{2}{3}$ natural size.
Fig. 11. Worked sandstone. $\frac{2}{3}$ natural size.
Fig. 12. Rude adze made of Igneous rock. $\frac{2}{3}$ natural size.
Fig. 13. Rude adze made of Greywacke sandstone. $\frac{2}{3}$ natural size.
Fig. 14. Rude adze made of Tufa. $\frac{2}{3}$ natural size.
Fig. 15. Worked pumice with a single perforation. natural size.